Challenging practice for AT2

Name:

Formula List

For the equation $ax^2 + bx + c = 0$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $A = \pi rl$

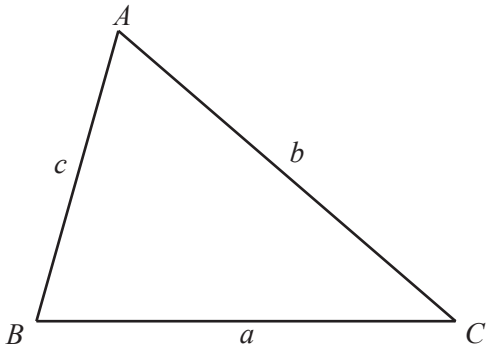
Curved surface area, A, of sphere of radius r. $A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $V = \frac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $V = \frac{4}{3}\pi r^3$



$\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

$a^2 = b^2 + c^2 - 2bc\cos A$

Area $= \frac{1}{2}bc\sin A$

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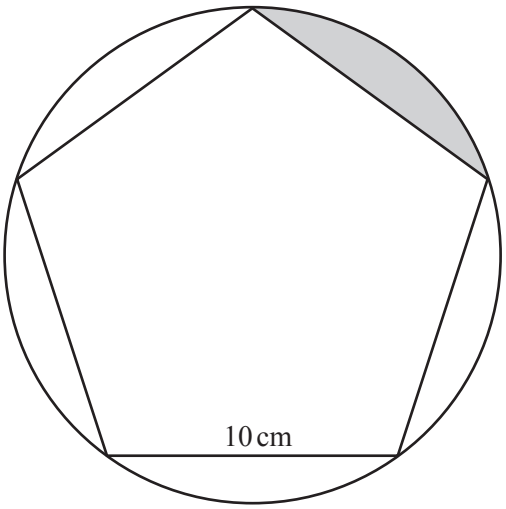

NOT TO SCALE

The diagram shows a regular pentagon, of side 10 cm, with its vertices lying on a circle.

(a) Show that the radius of the circle is 8.51 cm, correct to 3 significant figures.

[4]

(b) Calculate

(i) the perimeter of the shaded segment,

..... cm [3]

(ii) the area of the shaded segment.

..... cm^2 [3]

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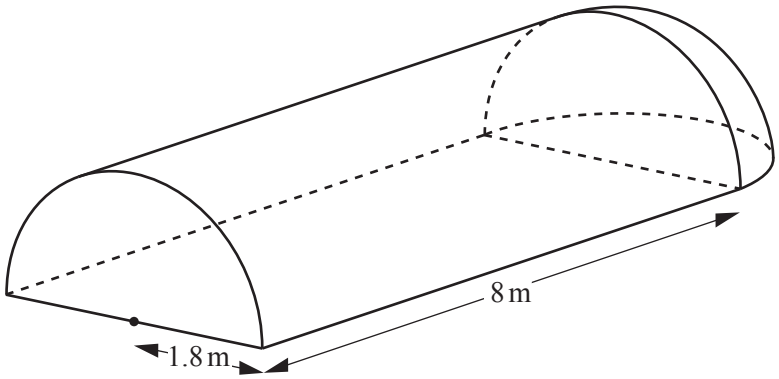

NOT TO SCALE

The diagram shows a polythene structure in which a farmer grows vegetables.
The structure consists of a prism with a quarter of a sphere at **one** end.
The cross-section of the prism is a semicircle.

The semicircle has a radius of 1.8 m and the length of the prism is 8 m.

(a) Calculate the volume of the structure.

.....m^3 [3]

(b) The curved surface of the prism and the two ends of the structure are made of polythene.

Calculate the area of the polythene.

.....m^2 [4]

14 A is the point (1, 9) and B is the point (7, 1).

(a) Find the length of AB.

..... [3]

(b) Find the co-ordinates of the midpoint of AB.

(..... , ...) [2]

NOT ON FRIDAY'S TEST HOWEVER
TRY USING YOUR NEW GDC SKILLS

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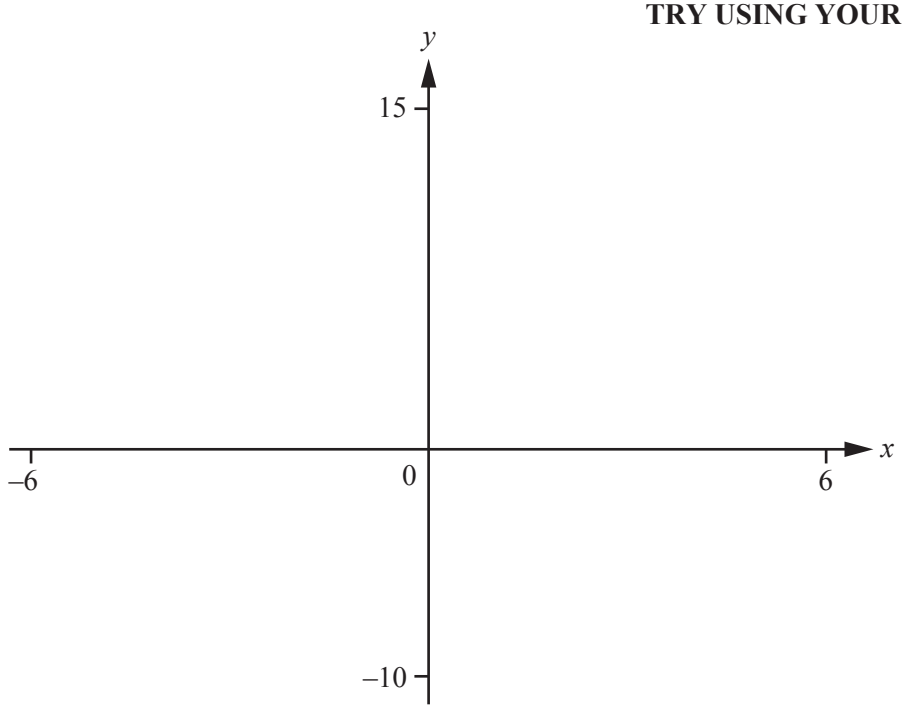


$$f(x) = \frac{(2x-3)}{(x+2)}$$

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -6 and 6. [3]

(b) Write down the equations of the asymptotes of $y = f(x)$.

.....

..... [2]

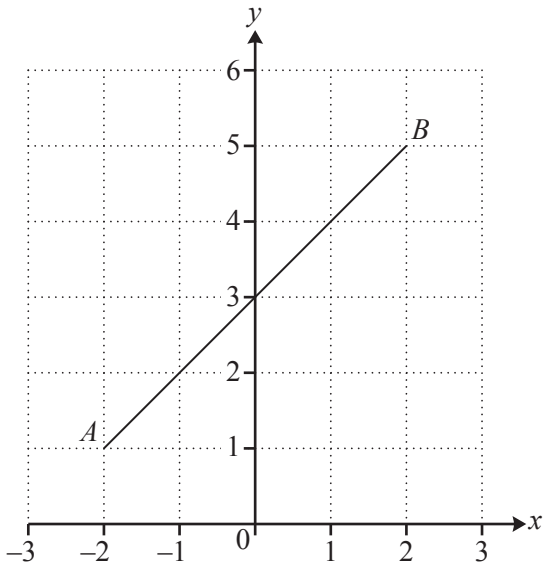
(c) $g(x) = 5 - 2x$

(i) Solve $f(x) = g(x)$.

PLOT BOTH AND SEE WHERE THEY CROSS

$x =$ ..... or $x =$ ..... [2]

14 The line AB is drawn on a 1 cm^2 grid.



(a) Write down the co-ordinates of the midpoint of AB.

(..... , ...) [1]

(b) Use Pythagoras' Theorem to work out the length of AB.

AB = ... cm [2]

(c) Work out the gradient of AB.

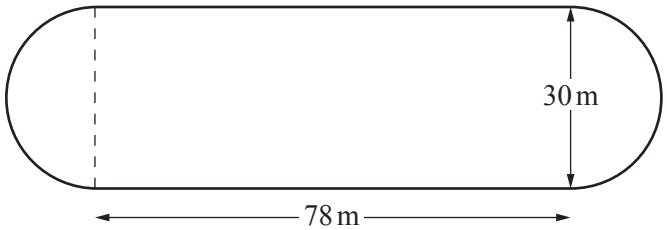
..... [2]

(d) Write down the equation of AB in the form $y = mx + c$.

y = ... [2]

Question 15 is printed on the next page.

10 A cycle track has two straight sections, each 78 m long.
Each of the two semi-circular ends has diameter 30 m.



NOT TO SCALE

Work out the perimeter of the cycle track.

..... m [3]

11 **(a)** Factorise.

$5x - 15$

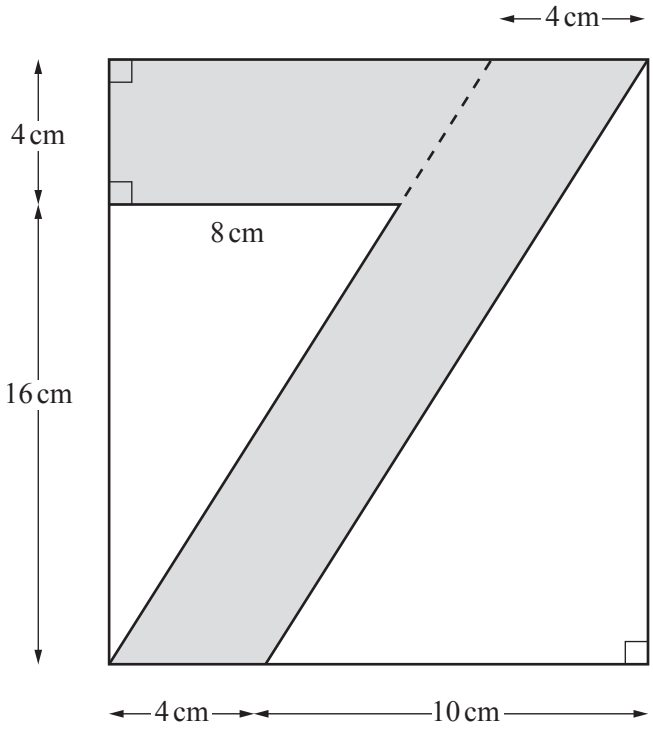
..... [1]

(b) Solve.

$4(3x - 2) = 28$

..... [3]

6 The number 7 is drawn on a rectangular piece of paper.



NOT TO SCALE

(a) Work out the area of the rectangular piece of paper.

.....cm^2 [2]

(b) Work out the total area of the shaded number 7.

.....cm^2 [4]

4 **(a)** Write in figures the number seven thousand and sixty one.

..... [1]

(b) Write down

(i) a multiple of 9,

..... [1]

(ii) an even number between 21 and 29.

..... [1]

(c) Find the value of

(i) $\sqrt{625}$,

..... [1]

(ii) 11^3,

..... [1]

(iii) $5^2 - \sqrt[3]{729}$.

..... [1]

(d) Insert one pair of brackets to make this calculation correct.

$$3 \times 6 + 5 - 4 = 29$$

[1]

(e) Work out.

$$\frac{25.2}{6.1 + 3.8}$$

Write your answer correct to two decimal places.

..... [2]

(f) Write 0.031 626

(i) correct to three significant figures,

..... [1]

14 Point A has co-ordinates (2, 3). Point B has co-ordinates (4, 11).

Find the equation of the line AB.
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

15 Expand the brackets and simplify.

$$(3x - 5y)(5x - 3y)$$

..... [3]

..... [3]

Questions 17 and 18 are printed on the next page.

17 Factorise.

$$4x^2 - 4xy - 3y^2$$

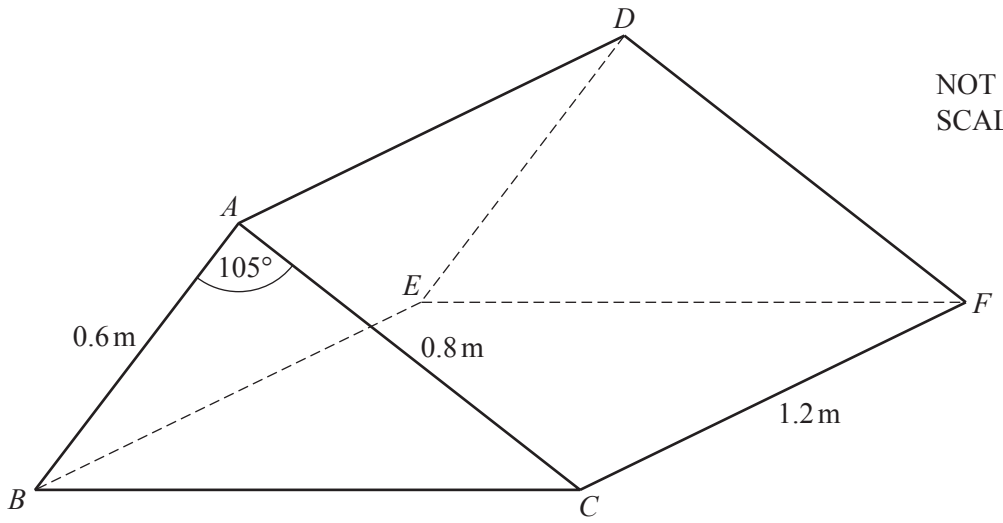
..... [3]

18 Write as a single fraction in its simplest form.

$$\frac{n+1}{n-1} - \frac{n-1}{n+1}$$

..... [4]

7



ABCDEF is a solid triangular prism.

(a) Calculate the volume of the prism.

.....m^3 [3]

(b) Calculate the total surface area of the prism.

.....m^2 [5]